

# Claims

- [c1] 1. An A/D converter with adjustable internal connection, for converting an alternating current source to a direct current source, comprising:
- a rectifier driver module, adapted for rectifying an input voltage from said alternating current source and converting said input voltage to a corresponding driver voltage;
  - a transformer module, including:
    - a plurality of piezoelectric transformers, each of said plurality of piezoelectric transformers having two input terminals and two output terminals, said two output terminals of said plurality of piezoelectric transformers being connected in parallel to serve as two output terminals of said transformer module; and
    - a control module, adapted for receiving said driver voltage, wherein said control module responsive to said input voltage and thereby adjust a connection between said input terminals of said plurality of piezoelectric transformers; and
  - an output rectifier module, adapted for receiving an output voltage from said two output terminals of said transformer module, and rectifying said output voltage from

said two output terminals to output said direct current source.

[c2] 2. The converter of claim 1, wherein said transformer module includes:  
a first piezoelectric transformer, having a first positive input terminal, a first negative input terminal, a first positive output terminal and a first negative output terminal; and  
a second piezoelectric transformer, having a second positive input terminal, a second negative input terminal, a second positive output terminal and a second negative output terminal;  
wherein said first positive output terminal is coupled to said second positive output terminal, and said first negative output terminal is coupled to said second negative output terminal.

[c3] 3. The converter of claim 2, wherein said control module includes:  
a first switch, coupled between said first positive input terminal and said second positive input terminal;  
a second switch, coupled between said first negative input terminal and said second negative input terminal;  
and  
a third switch, coupled between said first negative input terminal and said second positive input terminal;

wherein when said input voltage reaches a first predetermined level, said first and second switches are turned off and said third switch is turned on; when said input voltage reaches a second predetermined level, said first and second switches are turned on and said third switch is turned off.

[c4] 4. The converter of claim 1, wherein said rectifier module includes:

a rectifier, adapted for rectifying said input voltage to obtain a rectified voltage; and

a driver, including:

a first inductor, said first inductor having a first terminal receiving said rectified voltage and a second terminal coupled to input of said control module;

a second inductor; and

a driver switch;

wherein said second inductor comprises a first terminal for receiving said rectified voltage and a second terminal is coupled to a first terminal of said driver switch, and a second terminal of said driver switch is coupled to input of said control module, and wherein said driver switch is turned on/off responsive to said input voltage.

[c5] 5. The converter of claim 1, further comprising a voltage detector module for detecting said input voltage and sending a control signal to said control module based on

said input voltage to adjust said connection of said plurality of piezoelectric transformers.

[c6] 6.A method for operating an A/D converter with adjustable internal connection, for converting an alternating current source to a direct current source, comprising:  
a.providing a plurality of piezo-transforming devices;  
b.detecting an input voltage from said alternating current source; and  
c.adjusting an connection of input terminals of said plurality of piezo-transforming devices based on said input voltage to obtain an input/output voltage ratio of said plurality of piezo-transforming devices inversely proportional to said input voltage.

[c7] 7. The method of claim 6, wherein said plurality of piezo-transforming devices are a plurality of piezoelectric transformers..

[c8] 8. The method of claim 6, wherein said step c further comprising:  
when said input voltage is higher than a predetermined voltage, the connected of the number of said input terminals of said plurality of piezo-transforming devices is adjusted in a manner that an increased number of the input terminals of said plurality of piezo-transforming devices are connected in series; and

when said input voltage is lower than said predetermined voltage, the connection of the number of said input terminals of said plurality of piezo-transforming devices are adjusted in a manner that an increased number of the input terminals of said plurality of piezo-transforming devices are connected in series.